LA-UR-22-20040

Approved for public release; distribution is unlimited.

Title:	ALDWP Operational Highlights 2021
Author(s):	Lunn, Maureen Elizabeth Vigil, Kenneth C.
Intended for:	General reporting
Issued:	2022-01-04

Los Alamos NATIONAL LABORATORY

Calendar Year 2021

Associate Laboratory Directorate of Weapons Production

UNCLASSIFIED
LA-UR-XX-XXXX

ALDWP Operational Highlights 2021
All Submissions

- *Date at top of each section is date of submission to Communications & External Affairs (CEA) Division Office*
- *Submissions are then sent by CEA to Leadership Team (LT)*
- *LT chooses 4-5 highlights (from all Directorates) and those are sent to Field Office*
- *ALL submissions, whether or not they're chosen by LT, are collected by CEA and used for monthly reporting to leadership*
- *Any questions should be routed to Maureen Lunn, ALDWP Communications Specialist (mlunn@lanl.gov)*

January 6, 2021

Pit build completed before winter closure
The Weapons Pit production manufacturing team completed pit build 21-1 assembly operations on December 23, 2020. This build utilized all essential flow sheet steps and included the second -01 long tube cut off extension and welding activity. This is the best build produced in the MC4597-01 pit program to date. Final out-of-line operations, non-destructive evaluation, and radiography was completed during the week of January 4. Depending on the results from high energy radiography, this pit will be considered to be a candidate for CERT-02 and shipment to Lawrence Livermore National Laboratory in support of pit certification. It is notable that this build was completed while concurrently making Plutonium (Pu) metal, producing additional castings, machining Pu parts for Build 22, completing disassembly of two pits, supporting Nightshade B Pu target characterization, and precision machining of Jasper certification base plates.

January 13, 2021

Tritium agreement approved with Savannah River (ALDW/DDW)
A work agreement between LANL's Weapons Engineering Tritium Facility (WETF) and Savannah River Tritium Enterprise (SRTE) was approved by both sites on December 23, 2020. Tritium recovery and packaging to Savannah River Site for tritium recycle are successfully underway. The agreement allows for shipment of AL-M1s, a legacy container with molecular sieves holding tritiated water, in the shipping package known as bulk transfer shipping package. This is a major victory that will ensure robust recycle activities and avoid the expensive ~$1.5M flanged tritium waste containers previously used. The success is tied to collaborative communications, integrated schedule, joint Level 3 milestones, and a signed interface work order with technical detail providing joint benefits for LANL and Savannah River Site.

Supply chain management increases efficiency in support of plutonium operations
Supply chain management and procurement is both a challenging and crucial aspect of plutonium operations. Procurement teams increased their capacity and efficiency over 2020. The procurement team processes numerous items and service contracts such as vacuum gauges, non-nuclear hemi-shells, machined components for molds, and surveillance related items.

- In November, procurement teams that support weapons production successfully processed 600 procurement requests for TA-55, a 105% increase from November 2019.
- In materials management, the TA-55 warehouse team acquired 161 items and distributed 771 items in support of the TA-55 warehouse.
- The project team purchased and received 409 items and distributed 250 items in support of over 63 small and large projects.
- Employees participated in more than 10 design reviews in support of the Radioactive Liquid Waste facility, Capital Projects, and TA-55 Maintenance Projects to identify issues early that could delay procurements. Resolving issues before the final design is released minimizes costly design changes that result in schedule delays, all of which supports the infrastructure and equipment needs for pit production.

Weapons program procurement cycle times have also improved as teams have implemented continuous improvement initiatives. The group's ability to staff up and work collaboratively to develop action lists and program goals will ultimately lead to successfully procuring all weapons program and non-weapons program materials needed for the 30 PPY process, to have on hand a year in advance of scheduled need.

January 20, 2021

First co-mingled TRU waste shipment in TRIAD and N3B collaboration
TRIAD and N3B continue to expand our collaboration to make LANL and northern New Mexico even safer than it is today by getting Transuranic (TRU) waste to its forever home at the Waste Isolation Pilot Plant (WIPP) in Carlsbad, NM. On Thursday, January 14, the first co-mingled shipment to WIPP hit the road. This special shipment comingles new generation (TRIAD) and legacy (N3B) waste into a common TRUPACT II container bound for WIPP. The co-mingling of waste from the two contractors will maximize the utilization of the TRUPACT II and improve the overall efficiency of the TRU waste shipping process, ultimately resulting in more drums leaving Los Alamos in fewer trucks. Overall in FY21, TRU waste storage capacity utilization at TA-55 storage has dropped to 36%, significantly below the milestone of 50%. Year to date in FY21, sixteen shipments with 253 Triad TRU waste containers and 210 N3B TRU waste containers have been sent to WIPP.

Key safety upgrades made to the Plutonium Facility
Pressure Differential Transmitters (PDTs) are used within the Plutonium Facility (PF-4) to assist with monitoring pressure zones and controlling fan operation and ventilation. Within the PF-4 Ventilation System, a pressure differential is established and maintained to confinement zones within PF-4. This helps control radiological releases by maintaining a reliable cascading pressure differential between enclosures, laboratories, basement, and outside air. As of early January, all 22 PDTs in PF-4 were replaced. Prior to replacement, most of the PDTs were original to the facility and beginning to have functionality issues. The 22 PDTs that were replaced were supported through a NA-50 recapitalization project and represent a crucial step in modernizing and improving PF-4's systems. The replacement project took just over a year, beginning in November 2019 and completing January 2021. The installation of the PDTs

required support from operations, engineering, maintenance, procurement, safety basis, radiological control, waste, project management, and others to coordinate the installation.

January 27, 2021

Nuclear Enterprise Science and Technology certificate program begins at UNM-LA – The Associate Laboratory Directorate for Weapons Production (ALDWP) and the National Security Education Center (NSEC) have teamed to develop a new Nuclear Enterprise Science and Technology (NEST) Academic Certificate program to be offered through the University of New Mexico – Los Alamos (UNM-LA). The pilot program, which virtually kicked off on January 19 even amidst snow closures, received accreditation by the State Higher Education Department (HED) in FY20 and is designed for LANL's existing fissile material handler technician and technologist employee workforce. It will provide essential science, operations, and business education on all aspects of working in modern nuclear materials handling and processing facilities. The first course for the certificate program is called "Nuclear Facility Fundamentals." A call for nominations went out to the directorate and a cohort of 15 individuals has been established to start the program.

Plutonium samples slated for disposition find a new home for advancing our scientific understanding of plutonium aging
Having completed their intended lifecycle under the Plutonium Sustainment Program (NA-191), several plutonium samples that had been previously used to characterize the microstructure of shape cast parts were transferred to the Office of Experimental Science (NA-113) for re-purposing toward dynamic experiments. By taking full advantage of this existing material, LANL is able to conduct several key plutonium experiments in collaboration with Sandia National Laboratory at the Z-machine, that would otherwise not have been possible in FY21. The Z-machine is a pulsed power machine located at Sandia National Laboratories that is used to study the dynamic material properties of plutonium along weapons relevant trajectories. These experiments are a critical part of the science underpinning the Plutonium Aging National Strategy, and provide direct support for FY21 and FY22 L2 and L1 milestones, respectively. The material was transferred in December 2020 and the Z-machine experiments are planned for March 2021.

February 3, 2021

Plutonium operations continue work toward milestones
In LANL's Plutonium Facility in January, the year started strong with significant accomplishments in pit production-related operations. In metal production, an electrorefining ring was broken out and provided to the Foundry for use, keeping their operations moving forward. In the Foundry, heat treat operations were conducted as scheduled and pucks were produced to support sub-crit progams. In waste operations, 100% of planned containers and waste metals were removed as scheduled – 18 SAVYs (special material containers), 16 metals, and 4 drums. Plutonium machining also made progress on various disassembly, drilling, pressing, and rough machining processes while assembly teams continued inspection and cleaning operations on pit builds 21 and 22. Three engineering evaluation observations were successfully performed, covering leak test braze, cleaning, and density. These successes during mid-January will enable the initiation of pit build 22 operations in following weeks as planned, and positions LANL to begin the third build of the year before inventory.

February 17, 2021

Onboarding successes support future operations
When the New Employee Training (NET) Academy in the Weapons Production directorate kicked off just more than one year ago, the employees involved didn't know what lay ahead and the challenges in employee onboarding and training that 2020 would bring. While plans took an unexpected turn due to pandemic-related precautions, NET still found great success in its first year. In January 2020, the program started with about 30 employees in its first cohort. Today, it's grown and has 126 glovebox fissionable material handler operators-in-training actively participating in five different cohorts, or groups that started together over the past year. The program is closing in on its goal to reduce average qualification time by 50%, only set back due to COVID-19. So far, the academy has produced 29 qualified glovebox operators and 8 certified fissile material handlers. Combined with other efforts to reduce Q clearance processing time and Human Reliability Program certification time, NET Academy is improving the training process, setting up both new and current employees for successful long-term excellence in operations.

February 24, 2021

Plutonium Facility upgrades quickly lead to increased efficiency
After 22 pressure differential transmitters (PDTs) were replaced in the Plutonium Facility (PF-4) as of early January, significant time savings has already been observed. In a recent annual calibration of equipment, outage time in PF-4 was reduced by about 65% as the calibration was accomplished in less than one weekend, when previous outage times were one week or more. The time savings is thanks to the new components, which are more efficient and easier to manage. PDTs are electro-mechanical mechanisms that are subject to age- and wear-and-tear-related degradation. The new components eliminate potential struggles with adjusting and calibration for employees. Pressure Differential Transmitters (PDTs) are used within the Plutonium Facility (PF-4) to assist with monitoring pressure zones and controlling fan operation and ventilation, and their replacement project took from November 2019 to January 2021. The newly installed PDTs are also a commercially available product, and so PF-4 workers can have spares on hand, whereas the older models required design changes upon failure, causing inconsistency in equipment in the facility. The replacement of all 22 units has already led to less frustration for employees and significant cost and time savings throughout the facility.

March 10, 2021

Standards and Calibration Lab collaborates with TA-55 to increase safety and time savings
On March 2, the Standards and Calibration Lab's physical calibration team hosted an event on-site at TA-55 to calibrate scales and drum transporters used for waste management and shipping. It was the second TA-55-based event in the past year, which allowed for employees at the Plutonium Facility to enjoy the newfound ease and safety of the calibration team coming directly to them, while still adhering to COVID-19 policies and precautions. Calibration is required to maintain accuracy standards for the equipment used to characterize and weigh hazardous materials moving through the waste shipment process. To meet LANL Metrology Program requirements, measurements made by the equipment need to be traceable to National Institute of Standards and Technology (NIST) standard units of measure. Normally, TA-55 employees are required to load equipment onto trucks, secure it, transport it to TA-3; then wait for several weeks to bring it back into use. Bringing the calibration event to TA-55 makes it increasingly safer for employees and saves time and money by completing all the large-scale calibrations throughout TA-55 in only two days a year, rather than losing valuable time with the equipment out of commission while in line at TA-3. This was the second calibration event at TA-

55, and they are scheduled to happen every October and march to keep equipment up and running while lowering safety risks for employees.

March 17, 2021

Weapons production standdown provides organization learning for all employees
On March 10 and 11, the Associate Laboratory Directorate of Weapons Production (ALDWP) participated in a two-day "Standdown for Organizational Learning" from operations. Employees spent these two days in a professional development setting, learning about recent safety-related events, and participating in roundtable discussions with management on what went right and what did not go as expected in each event. The days' agendas included presentations on COVID-19 status and expectations (with content provided by Lab Director Thom Mason), sharing on nuclear and non-nuclear operational upsets and lessons learned, and group leader-led roundtables where employees participated in open and honest discussions about ideas for improvements in their workplaces. Of the directorate's more than 1,300 employees, management saw near full participation, even exceeding the 1,000 participant Webex limits and thus providing back-up sessions. The standdown days allowed for all ALDWP employees to pause and take some time to learn and share and resulted in a successful opportunity for learning.

March 24, 2021

Pit builds 22 and 23 find success
Pit build work has continued successfully in the Plutonium Facility over the past month. Non-destructive evaluation, which includes radiographic testing and computerized tomography, has completed for build 22, which is the second build of the calendar year. Tube cutoff and welding operations were also successful. Build 23 is in progress and on track to be completed in April, prior to nuclear material control and accountability inventory. For the Nightshade B plutonium components, all final machining, cleaning, inspection, and profilometry were successfully completed and allowed for assembly operations to begin in mid-March. This successful effort effectively maintains national program execution dates.

Non-nuclear production works passes milestone reviews
The Prototype Fabrication division successfully passed the ALT940 electronics module subassembly (EMSA) component production readiness review (PDDR). The PDDR is one of the critical gate reviews in the NNSA 6.X Production Realization Process that must be passed for a program to move out of the Development phase and into the Process Prove-in phase before production readiness can be achieved. The PDDR ensures that requirements necessary for production are in place and mapped from design to production. The Prototype Fabrication team provides weapons system components in order to improve the national security posture in support of the W88 ALT940. In Detonator Production, a 4E10 detonator cable assembly lot was diamond stamped and the ALT940 flat flex cable PDDR was completed.

March 31, 2021

Equipment calibration supports quicker plutonium measurement
In mid-March, the plutonium facility's Solution Assay Instrument (SAI) was successfully calibrated for both SAI instruments in the aqueous chloride and aqueous nitrate processing rooms. Calibration of both SAIs will allow rapid plutonium measurement without having to sample out for radiochemistry. The SAIs will also serve as back-up capabilities for each other. The SAI was made operational and qualified for use last summer for the first time since 2012,

and supports the software that tracks nuclear material accountability. To calibrate the instrument, teams measure and validate material readings with real world samples. All of these efforts in part allow the implementation of new criticality safety limits, which will dramatically increase material output to better support the pit manufacturing mission.

April 14, 2021

Major lab renovation at Sigma will enable weapons production mission
A recent major renovation was completed in March at the Sigma facility, which supports research and manufacturing for the weapons program at large. This includes items for the Weapons Production directorate, such as finishing for ALT 940 assemblies. The electrochemistry area at the Sigma facility underwent a major cleanup and renovation, which started in January 2019. The total area of the renovation was 4,000 square feet of lab space. A variety of teams and employees collaborated to plan the project, remove contamination from the aging facility, gut the room of all former equipment and tanks, and install brand new electrical, plumbing, ventilation, and equipment to support electrochemistry efforts. Most if not all construction and installation activities were completed adhering to COVID-19 controls and protocols. Electrochemistry is a key aspect of producing materials and components and supports pre- and post-production cleaning processes, surface characterization and corrosion studies. The renovation transformed the room from being nearly unusable to a state-of-the-art processing center that will support the nuclear enterprise at large.

April 21, 2021

TA-55 teams receive NA-50 Excellence Award
Two TA-55 teams were awarded the NA-50 2020 Excellence Award: the PF-4 capital column testing team, and the Radioassay and Nondestructive Testing (RANT) facility operational readiness and expanded shipping capability team. The NNSA office of safety, infrastructure and operations is known in shorthand as NA-50, and works to ensure that existing architecture is safely operated, effectively managed, and that current and new facilities are adequately maintained to meet mission needs. The award recognizes teams and individuals for outstanding accomplishments involving innovation, effectiveness, teamwork, overcoming adversity, and enabling future success. At LANL, success in infrastructure and operations is no small feat as employees work amidst aging facilities and rapidly expanding operations. The PF-4 capital column testing team participated in a partnership at the University of Nevada – Reno (UNR) Earthquake Engineering Laboratory to define the capacity of the capitals that exist at the top of every column that supports the PF-4 laboratory floor. The testing results indicated that the capitals are not vulnerable to expected seismic demand in ways previously believed. The RANT team transitioned to safe and expeditious TRU waste shipments to lower the TRU waste inventory and support the plutonium missions at LANL. At the time of the award submission, TRU waste storage capacity utilization at TA-55 storage had dropped to 36%, significantly below the milestone of 50%, and has dropped further since. These teams and others nominated exemplify the best of LANL's commitment to safety and smooth operations amidst changing infrastructure.

April 28, 2021

First batch released of pit manufacturing research and documentation from Rocky Flats
On March 31, the first boxes of the documents obtained from Rocky Flats were environmentally scanned and released for categorization after months of preparation. The process is continuing at a steady pace to bring historical knowledge on pit manufacturing to LANL teams. Due to the

nature of the storage of the thousands of documents transferred to LANL from Rocky Flats in August 2020, before any review of the documents can begin, they must be tested for beryllium and other hazards. Once released by the environmental team, records enter the categorization process known as KWIC (key-word, index, categorization). As of April 15, thirty boxes had been tested for hazards, ten released, and six put through the KWIC process. Those six boxes alone contained a total of 13,692 images and pages. The effort is a gargantuan task spanning multiple teams across the Lab to ensure documents are categorized correctly, classified, and then made available to those at TA-55 with a need-to-know. The project is expected to lead to millions of dollars in savings in research and development.

May 12, 2021

8 Dragonfly mission heat sources successfully packaged and ready for INL
During the last week of April, 8 general purpose heat sources (GPHS) were packaged and prepared to ship from LANL to Idaho National Laboratory (INL). These are the first GPHS to be prepared for INL since 2018 (when clads in support of Mars 2020 were last sent). The shipment of these 8 clads supports NASA's 2027 Dragonfly mission to Saturn's moon Titan. LANL is tasked with manufacturing a total of 32 GPHS clads for Dragonfly, and shipment is the culmination of three years of effort to prepare the project. The GPHS is the radioactive sealed source which generates heat through alpha decay of plutonium-238. In order to transfer the GPHS, special containment vessels permitted for transfer between DOE sites must be used. Sealing these vessels is no simple task – it involves special nuclear materials (SNM) operations including welding, leak testing, and radiography in order to ensure safe transfer of the heat sources. This effort required extensive integration of teams in the plutonium facility in designing and procuring new equipment, equipment installations, qualifying the operation, and transitioning to nuclear operations. Due to the thermal power degradation of the heat sources, a timely transfer after they're manufactured is crucial, and this team expedited the effort to provide materials ready to ship. This achievement reinforces LANL's ability to meet current and future radioisotope power systems program milestones and missions.

May 19, 2021

Physicists, engineers, and waste specialists collaborate to resume operations for critical resources
A pyrophoric event resulting from the removal of waste from an inert glovebox paused all waste operations in PF-4 on March 24, including the TA-55 gas-gun. A team composed of staff from multiple groups and divisions worked collectively to analyze all materials utilized in gas-gun operations for potential oxidation, reaction, and pyrophoricity. The team presented their findings to a review committee, which resulted in release of the hold on waste operations for the gun the first week of May. Return of the gun to operational status enables the execution of critical experiments supporting multiple milestones in the areas of certification, advanced manufacturing, and advanced diagnostics.

May 26, 2021

Waste inventory reduction freeing up space
Recent transuranic waste shipments at the radioassay and nondestructive testing (RANT) facility continues to support production efforts. Loading shipments of waste from Area G resumed in April. Significant progress was made in inventory reduction at Area G. Deinventory efforts at Area G free up contingency space for Triad waste during pauses or outages at the Waste Isolation Pilot Plant (WIPP), or to store oversized items. Meanwhile, back at TA-55,

storage utilization continues to hold at less than 50%, currently 37%, allowing space to support production work.

Nuclear material inventory in May ensures safe operations
Employees in the plutonium facility started Nuclear Material accountability and control (NMC&A) inventory on April 28, as scheduled and completed on Friday, May 21 for 9 of the 10 Material Balance Areas (MBAs), which were released to resume production activities on the morning of May 24. Completion of the inventory was accomplished in 14 work days, a week and a half ahead of schedule. NMC&A inventory is a regular process that ensures all hazardous materials are accounted in the appropriate levels and locations. PF-4 operations depend on successful and timely inventories in order to ensure safety of materials and employees during work, and ensure future use of the necessary materials. NMC&A inventories take significant preparation as operations must pause during the inventory, which supports many PF-4 operations staying on schedule.

June 16, 2021

Major digital sale reveals increase in efficiency and environmental-friendliness
On May 10, a sale of detonators was submitted to the document control records management system as an electronic file sale, in contrast to the paper sale previously used. The digital sale, which is the process of handing over to NNSA a product that has been quality-checked and approved by LANL, was 29,148 PDF pages, which previously would have been required to be printed, bound, and physically moved on dollies. The new system has been implemented by staff in weapons production to increase efficiency and environmental improvement in the sale process. The overall evolution of digital sales at LANL began in 2015 when teams first started using PDF files and/or computer displays rather than paper. In 2018 new software was developed that supported the entire process without having to create PDF files; instead, data from production systems is strategically redisplayed to allow users to review and evaluate the data. A typical sale formerly took weeks or even months to conduct. The new software and teams dedicated to the process have resulted in a sale data package being complete in half a day, with high levels of efficiency and accuracy. All of this lays the groundwork for much smoother sales of products such as detonators, NASA products, and ultimately plutonium pits and reaps ongoing benefits for both LANL and NNSA staff.

June 30, 2021

TA-55 guest scientist receives Nuclear Technology R&D Award
A guest scientist at LANL and PhD candidate at the US Air Force (USAF) Institute of Technology, First Lieutenant Ashwin Rao, received the US Air Force and DOE Nuclear Technology R&D Award. This award is given by the Air Force and DOE to a student with significant R&D efforts that support nuclear technology, and is a competition among scientists from around all USAF research institutions. Rao's contributions at LANL have been primarily in the area of the Material Recycle & Recovery (MRR) program, which supports pit production efforts. Rao made significant contributions in a machine learning technique applied to the hand held laser induced breakdown spectroscopy (LIBS) instrument. The technique can offer simple and efficient analysis inside of gloveboxes that are holding legacy items (metals and materials) for discard. The process can not only add efficiency to processes in the plutonium facility that involve material analysis and movement, but also provide a greater level of safety for workers. The award and Rao's contributions will bring awareness to the achievements and science happening in the plutonium facility.

July 7, 2021

Two 1E40 detonator production and sales hit benchmark
As part of the B61-12 Life Extension Program (LEP), Los Alamos National Laboratory (LANL) is the Design Agency (DA) and Production Agency (PA) for the 1E40 detonator, which is the first detonator designed, tested, manufactured, and fielded since the Cold War. The LANL DA and PA collaborate and work together closely for this product line alongside the Production Agency Quality (PAQ) division. Employees from these organizations have implemented a first of its kind continuous production process that allows the constant and consistent production and acceptance of these detonators for next level assembly. In June, a significant benchmark was achieved with this process when two sub-lots of detonators were successfully accepted and diamond stamped by NNSA within two months of one another. The exceptionally collaborative environment that exists between the DA and PA facilitated this accomplishment, and was furthermore made possible by outstanding coordination with all supporting organizations, including PAQ's Product Verification and Submittal team who coordinated the sales with NNSA's Los Alamos Field Office. These efforts will contribute to the further success of the 1E40 detonator product line.

July 14, 2021

Process Monitoring to increase production availability from 64% to 88%
The Process Monitoring Team, part of Nuclear Material Control and Accountability (NMCA) at TA-55, and Weapons Production have achieved another milestone towards increasing production availability from 64% to 88% as part of a holistic improvement effort in PF-4. Process Monitoring detects out of control conditions and reconciles inventories of nuclear material, near-real time, allowing for continuous reconciliation and increases the duration to process between inventories. Production in PF-4 has been suspended for approximately 18 weeks a year for the inventory in the processing material balance areas (MBAs), including those areas that comprise pit production. The team's collaboration with AMPP-3 has already demonstrated process monitoring performance improvements in the ARIES MBA and decreased down time significantly. The plans, procedures, on the job training, ARIES-specific statistical process control limits, and simulations have all been reviewed and approved as of June 2021. Integrated with other NMCA improvements, Process Monitoring will increase the available production time >37% as it reduces down time from 18 weeks per year to just 6 weeks for inventories.

July 21, 2021

Subcritical experiment successful with the help of TA-55 divisions
On June 22, the Nightshade B subcritical experiment (SCE) was successfully executed at the U1a Complex of the Nevada National Security Site. Nightshade B is the second of three SCEs planned as part of the Red Sage – Nightshade series, each with multiple independent experimental devices all initiated almost simultaneously inside a single confinement vessel. Workers at TA-55 and in the MST-16 division (within the Associate Laboratory Directorate of Physical Sciences) played a critical role in producing the targets used in this experiment. Four divisions within the Associate Laboratory Directorate of Weapons Production came together to overcome a number of challenges to cast, machine, inspect, assemble, package, and support unpacking and gas operations in Nevada. Lessons learned were applied to fabrication and assembly of the more complex targets to support success in the next series. The SCE series will help inquire important data to support the NNSA mission.

Pit Technologies Division plans ahead and meets goals during July 4 holiday week

A short operations week such as the July 4 holiday can sometimes serve as an interruption to work in the Plutonium Facility, but thanks to strategic planning ahead, Pit Technologies completed a full week's worth of achievements despite the break. The logistics team has multiple jobs a day – including introducing items into gloveboxes for work and bag outs, which is waste removal from glove boxes. With some planning, the logistics team supported bag outs in two material management rooms in sequence to compensate for a short holiday week. This allowed the same amount of waste to be moved as would normally be expected during a regular work week. Waste removal is important to ensure availability of gloveboxes for a variety of work related to pit production. The logistics team, formed in 2020, allows other groups in PT to focus on their specialized work, without having to worry about tasks such as waste removal.

Process changes in PF-4 lead to inventory completion in record time
Process improvement changes are helping reduce the time it takes to complete inventory in the material balance areas (MBAs) at TA-55. Inventory is a recurring process to validate that the virtual inventory of nuclear material and special nuclear material accurately matches the physical inventory. The June inventory was completed in nine working days, which is record time. The June inventory was also the first time in at least half a decade that resulted in zero system generated action forms, which are documentation of issues identified during the initial stages of the physical inventory. The April inventory set the previous record for completion, at 14 working days, compared to the average 25 to 30 days. Data for April and June show the top contributions to these successes are improved processes and procedures, better cross-communication, and improved pre-inventory preparations, and the decrease in action forms. Since December 2020's inventory, the transition time between inventory steps has improved, reducing total inventory time for a majority of MBAs, allowing for less outage time in the production facility. The changes and improvements are a collaborative effort between the Nuclear Material Control and Accountability (NMCA) Program, and the Associate Laboratory Directorate for Weapons Production (ALDWP).

July 28, 2021

Key space in PF-4 cleaned out and made ready for the mission
On, June 24, 2021, the Aqueous Nitrate Team safely removed combustible material and completed significant housekeeping in a key walk-in enclosure, in support of the Materials Recovery & Recycle (MRR) program. The enclosure was highly contaminated and had not been entered in more than ten years. The area contains the evaporator system that is used to process the effluent streams from the aqueous nitrate line. This capability is used for the recovery of plutonium from byproduct streams from pit manufacturing. The early planning, coordination and support with an integrated team led to a job well done. Controls included protective equipment, time limitations due to conditions with heat stress risk, medical response team in attendance, radiological control technicians and subject matter experts. With outstanding support from radiation protection and waste personnel, the team was able to complete entry into and exit from room safely and expeditiously and remove the necessary materials. This achievement will allow the space to be effectively utilized for future production work and to prepare for the readiness process for routine operations.

High precision camera system deployed in July creates efficiency in machining
In LANL's Prototype Fabrication (PF) Division machine shops, a new two-2camera system has been deployed that will increase efficiency and accuracy in the-machining process. The Optical Tool Locator (OTL) 2 camera system was funded by the DDSTE FY21 capability investment and developed on-site by PF employees, adding a second camera to the single camera system used previously. In early July, the OTL2 was tested on multiple lathes in the PF machine shop

and successfully brought ease of use through instantaneous high resolution images. The new system requires less equipment, as the OTL2 measures and gives information on screen, saving machinists the time from measuring tool nose geometry and locations manually. The system modernizes older machines with new technology, thus deferring the need to replace them. Furthermore, this system is being integrated with super precision machine tools that are required for high precision, tight tolerance fabrications. This is a technology not yet available on any current machining platforms; therefore, PF employees are currently leading the collaboration with machine tool manufactures to incorporate OTL2 system and provided measurements directly into the controller. Ongoing use of the OTL2 will support the weapons engineering hydro program, subcrit experiments, stockpile modernization, Pu sustainment, global security, and the manufacturing of non-nuclear components, all with greater efficiency and accuracy, enabling both cost and time savings.

August 16, 2021

Maintenance and equipment updates support plutonium operations

July's achievements in TA-55 weapons infrastructure included waste operations, PF-4 trolley updates, and other maintenance. On July 9, shipments of transuranic waste from the Radioassay and Nondestructive Testing (RANT) facility returned to a schedule of two shipments per week, including N3B waste. Inside the plutonium facility, updated trolley lights were installed to support material movement; the project was planned to minimize impacts to programmatic work happening in the plant. Other lighting updates, pump seal replacement, filters and fire water tank improvements were all implemented to support continuing plutonium mission operations.

September 1, 2021

Confinement Vessel Disposition (CVD) Project at CMR ships first vessel

A years-long materials disposition project based at the Chemistry and Metallurgy Research (CMR) facility has shipped its first vessel after closing the emptying and dispositioning portion of the project in 2020. LANL, during the 1970s-80s, conducted experiments that generated data for the use in computer modeling to evaluate the performance of nuclear weapons. Six foot sealed steel vessels were used to contain the blast and radioactive material. The CVD project removes the contents of these legacy 6-foot diameter vessels, recycles useful material, and dispositions the balance of the material as waste while exercising commitment to safety, security and the protection of the environment.

The tenth and final vessel was confirmed empty of transuranic waste and moved to the staging in December 2020, demonstrating the successful disposition of this legacy plutonium material that had been staged on site in these confinement vessels for more than 40 years. On Thursday, August 26, the first vessel shipment was successfully sent off-site, setting the stage for future emptied CVD waste shipments. Meeting FY21 milestones, this shipment opens the door for the future shipment of the balance of the Pu-contaminated sphere and sets a precedent for oversized waste shipments across the complex. Future shipments will ensure that these legacy vessels are removed from the CMR facility and relocated to an appropriate destination, supporting the closure of CMR.

September 8, 2021

RLUOB receives Certificate of Occupancy

At the end of July, the Radiological Laboratory, Utility, and Office Building (RLUOB) located at TA-55 received the Certificate of Occupancy (for life safety) after completing repairs to fire barrier deficiencies that were discovered approximately two years ago. The building is home to a variety of offices in support of the Plutonium Facility and laboratories where analytical chemistry, materials characterization, and other work is performed. The RLUOB team who supported this effort worked through engineering and repair challenges, COVID-19 restrictions, and logistics for minimizing impacts to RLUOB residents. The repair jobs were completed safely and efficiently with good documented evidence.

September 15, 2021

Ventilation upgrades in PF-4 support safety and environmental responsibility
Twelve variable frequency drives were seismically tested and anchored to meet PC-3 (Safety Class) requirements to replace the vintage motor control center components serving the system as well as the aging pneumatics. This improvement eliminated legacy violations of the National Electric Code for working clearances. It represents a vast improvement in the PF-4 HVAC system. PF-4 ventilation system delivers airflow from corridors through laboratories to gloveboxes to support a cascading differential pressure in PF-4 from low to high probability for radioactive material contamination. Exhaust airflow is controlled by controlling the fan motor with a variable-frequency drive (VFD) control unit. Pressure differentials are monitored by pressure differential transmitters. The pressure differential transmitters send signals to a controller to vary the position of control dampers and/or control fan variable frequency drives (fan motor speeds) to obtain and maintain the desired differential pressures. This upgrade of control eliminated the aging pneumatics used to control these systems. In essence, six different zones of control (redundant fans) were converted to full analog control to enhance reliability and reduces failure modes associated with the pneumatic components. The conversion also results in reduced power consumption and significantly lower noise (decibels). These outcomes make this equipment more environmentally responsible as well as creating a more habitable and safer workplace.

Power supply and pit surveillance programs surpass milestones
The Power Supply Surveillance Program surpassed Level 2 Milestones in FY21. The program successfully completed all surveillance requirements for the Sandia National Laboratory Design Agency (SNL-DA), while also completing three additional Significant Finding Investigations surveillance tests. The dedicated efforts by AMPP-1 and MST-16 were exemplary and for the first time since prior to FY13, the program exceeded their Milestones.

The Pit Surveillance Program had a very successful FY21 performance by meeting all committed L2 Milestones. The program doubled output for pit surveillance testing as compared to the past 8 previous years. The program was able to meet L2 Milestones while challenged with early FY21 COVID-19 impacts and Pu Modernization priorities. Early in FY21, the program initiated a process improvement effort in collaboration with the LANL Design Agency (DA) and made significant improvements as compared to previous FYs. The program will continue to make improvements to ensure continued success and alignment with LANL-DA surveillance requirements. PT-DO, MST-16, PAQ and the LANL-DA did a great job improving program execution in FY21.

September 22, 2021

Decreased risk of glove breach due to new safety solution

The Pit Technologies (PT) division implemented a process improvement that decreases the risk of a glove breach and reduces job time by 1-2 hours. During a drumout the week of September 13, the Logistics Team person in charge (PIC) had a questioning attitude and identified the original process to handle sharp items posed an unnecessary risk for a glove breach. Sharp items have tape removed from the edges to perform a visual examination. Then, the tape would be reapplied to the sharp edges before the items could be bagged out. To increase safety, the PIC recommended introducing the SAVY container, then removing the tape for the visual examination. Instead of reapplying the tape, the items with sharp edges were placed into the SAVY. The SAVY was then disposed of directly into a drum using the drumout port. This improvement increases both safety and efficiency in support of the pit production mission.

September 29, 2021

Laboratory Supports Successful Completion of Subcritical Experiment

The Nightshade C subcritical experiment (SCE) was successfully executed at the Nevada National Security Site (NNSS) on September 16, 2021. The Red Sage-Nightshade project is a series of subcritical dynamic plutonium experiments designed to measure plutonium ejecta. Several divisions, including Pit Technologies (PT), Production Agency Quality (PAQ), Nuclear Process Infrastructure (NPI), and Materials Science and Technology (MST), played a significant role in the project. Nightshade C was the final of three experiments, each of which contained six plutonium samples with slightly different characteristics.

Production of the Nightshade experimental packages required expertise from across the production agency, including developing new processes for production of plutonium, casting of plutonium, surface machining, assembly of the experimental package, and supporting the experiment at NNSS. Lessons learned during production and assembly of Nightshade A and B contributed to the success of Nightshade C. All three SCEs were executed in FY21. Once final analysis is complete, the entire data set will provide important information to improve the Laboratory's understanding of plutonium under dynamic conditions and improve the scientific computations and modeling capabilities.

October 6, 2021

Recruiting and hiring efforts in ALDWP prove fruitful

The Associate Laboratory Directorate of Weapons Production hosted a hiring event on Sept. 29-30. Forty-eight individuals virtually attended the event, which focused on hiring for positions in Manufacturing Managers, Research Technicians, Research Technologists, Special Materials Specialists and Operations Support Specialists. Attendees were from 20 states, with the majority local to New Mexico. At the event, 13 on-the-spot offers were made. In total for the FY21 fiscal year, ALDWP had 337 external hires, 145 internal hires for a total of 482.

Detonator Production ships Lot 3354

Detonator Production in partnership with the Design Agency (Q-6), Production Agency Quality (PAQ) Division and the Los Alamos Field Office, sold Lot 3354 to NNSA. This lot was shipped to Pantex and will support the W76 into the future. The sale and shipment of Lot 3354 was accomplished prior to close out of fiscal year (FY) 2021, achieving a key milestone that took active participation from several stakeholders within the Lab as well as external to LANL who found remedies to address challenges associated with this lot that persisted since 2019.

October 13, 2021

Two plutonium pit builds completed before FY end

The Pit Technologies (PT) division completed pit builds 24 and 25 prior to the end of fiscal year (FY) 21. Several significant process improvements were implemented and both builds yielded. In total, the PT division built five pits in FY21 – keeping up with its deliverables while maintaining COVID-19 protocols. These builds will be used as certification units (CERT03 and CERT04) and are important for progressing towards the First Production Unit (FPU), as the division prepares to build at least 30 pits per year starting in 2026.

October 27, 2021

ARIES program meets end of year milestones
The Advanced Recovery and Integrated Extraction System (ARIES) program has met milestones across much of its FY21 operations. The ARIES pit cutter has been working for the past five and a half years, culminating in a successful Management Self-Assessment in FY21. It was a significant effort that will allow the ARIES Mission to both accelerate its stabilization ofPu-239 and facilitate removal and disposition of material at other DOE sites. The ARIES group, AMPP-3, also completed the Management Self-Assessment readiness activities for the thermogravimetric analysis of material, which must occur to meet quality requirements prior to shipment from TA-55. This will allow employees to take measurements and reduce risk to the LANL mission.

MR&R completes special material shipment
In the AMPP-4 Materials Recovery and Recycle (MRR) group, employees completed the Pu-242 metal preparation and shipment. This was a huge effort undertaken to prepare, package, and ship materials with support from multiple organizations across TA-55 and the Laboratory. Essential to national security, the process also ensured that workers were safe and all security requirements were met. AMPP-4 also safely repacked 50 items in the vault, met all safety and security requirements, improving the safety of the vault and meeting the L2 milestone. The vault's secure space is of paramount importance to the TA-55 and ALDWP mission.By ensuring legacy materials are removed, the MR&R program provides a critical tool the LANL Mission.

November 3, 2021

Upgrades to detonator production facility complete
Meeting the strict design requirements for detonator parts will now be easier, thanks to the addition of a cleanroom in the detonator production facility located within a secure area at the Laboratory. The new space will allow workers to make detonator components that are free of airborne particulates, an important feature for the customers who contract with the Lab for these products. The work was completed by an integrated project team consisting of members from the following areas:
Capital Projects
Facilities and Operations
Non-Nuclear Production Office / Detonator Production Division
Weapon Modernization Production
Weapons Facilities Operations
Facility Operations Director

The cleanroom was designed and scoped to be a "room within a room," which created the controlled environment necessary to produce detonator parts. The legacy building where detonator components are produced could not filter out all of the particulates that naturally occur in the ambient air; installing a specialized cleanroom within the building solves this problem.

An integrated project team worked with the vendor to install a standard “off the shelf” design to meet the specific needs of the program. To ensure it meets the definition of a “cleanroom,” HVAC, exhaust fans, compressed air and HEPA units were installed in the 40 x 30 square foot space. Crews also installed standard electrical, water and fire protection systems in the new addition.

With equipment installed, the new cleanroom is officially up and running, and ready to meet the needs of the Laboratory’s customers.

November 10, 2021

New Webpage to help streamline TA-55 training
The Associate Laboratory Directorate for Weapons Production (ALDWP) launched a new webpage in early November to help hundreds of new employees navigate through the training process, specifically for access to TA-55 facilities. Training requirements to access buildings at TA-55, or those that support it, vary. The new TA-55 FOD Facility Access Training webpage is a one-stop-shop for facility access training requirements.

It includes access training requirements, training flowsheets, training contacts, and links to access forms that need to be submitted when trainings are complete. It also features worker emergency responses for each building.

In fiscal year 21, ALDWP hired nearly 500 people – 337 external hires and 145 internal hires.

November 17, 2021

TA-55 crews cut through the waste
Over the weekend of October 30, crews were busy in the plutonium facility cutting apart large pieces of metal waste – too large to fit on the trolley. The project required a lot of planning, and it was a collaborative effort between TA-55 Process Maintenance and Decontamination Service (PMDS), Nuclear Material Control Accountability (NMCA), Operational Readiness Implementation (ORI) division, and the Pit Technologies (PT) division. This project was planned to coincide with inventory, as to not interrupt pit production time. The material is now in a manageable size, and it is ready to go to waste processing so it can be safely disposed.

Critical plutonium experiments continue as Z-machine waste is shipped
A multi-organizational team with staff from LANL, Sandia National Laboratories (SNL), the Waste Isolation Pilot Plant and Weston Solutions Inc. recently executed a shipment of seven waste boxes of expended Plutonium Isentropic Compression Experiments (Pu/Z/ICE). The waste was removed from SNL, unpackaged at LANL, and transferred to N3B, where they await final disposition to WIPP in southeastern New Mexico. This waste stream had accumulated over the past eight years from experiments conducted on the SNL Z-machine, and its removal represents a multi-year effort with engagement across the national security complex. The removal of this waste stream allows for the continuation of critical experiment sets on Z-machine, which support NNSA's stockpile stewardship program through enabling advancements in plutonium aging science and next-generation plutonium manufacturing science. LANL has been leading the plutonium experimental design efforts on Z-machine in a partnership with SNL since 2006. Recent advancements in pulse shaping and drive configurations have increased the programmatic value and impact of these experiments. To enable continued execution of these critically important experiment sets, it had become imperative that the waste accumulated from these experiments be removed from SNL. This

recent shipment was a culmination of years of planning and collaboration, and sets the stage for future advancements in plutonium science on the Z-machine.

November 24, 2021

Pit product realization team receives positive results from gate review
The NNSA has signed off on a positive report on LANL's progress to first production unit (FPU) of plutonium pits, revealing a recognition of successful processes and collaboration. As part of the MC4597 pit product realization process, a series of integrated phase gate (IPG) reviews are conducted following an integrated phase gate implementation plan (IPG-IP), which is issued by the federal program manager (FPM). The MC4597-01 pit product realization process is in the Production Engineering Stage and the product pre-pilot production (PPPP) gate review was held at LANL November 2-3. The MC4597 product realization team (PRT) provided a review that included status of design and releases, qualification status, risk analysis/producibility, impacts resulting from laboratory, technical and peer reviews, schedules, and costs. The chair and review panel recognized that the PRT has made significant progress toward first production unit (FPU) as demonstrated by recent successful builds and the comprehensive PPPP gate review. The panel also recognized that the collaborative environment that has been developed in the PRT represents best practice and was noted by the panel as positive. The judgement of the panel was "continue with conditions" (which was expected). The panel provided preliminary conditions and results were reviewed by LANL, LLNL, KCNSC for feedback to NNSA. Final documentation of the gate review was issued on November 22.

TRU waste shipping successful in 2021
In FY21, ALDWP and ALDESQHSS teams together shipped a grand total of 1,241 transuranic (TRU) waste drums to the Waste Isolation Pilot Plant in Carlsbad, New Mexico. These shipments included 730 Triad containers and 511 Triad-N3B containers from Area G. As teams work hard to move out waste drums and make room for future production, the inventory of drums at TA-55 continues to hold around 30-32%, an all-time low that is necessary for operations to continue.

December 1, 2021

PT Division Resumes Casting and Demonstrates Increased Capability
The PT Division's Foundry and Logistics Group (PT-4) was released to resume castings following re-establishment of negative pressure circulating chilled water (NPCCW) and the October nuclear materials control and accountability (NMCA) inventory. Two shape castings were produced during the week of November 15. This is a notable success for several reasons. The team and equipment performed dry runs prior to inventory release to ensure process equipment operability. The team was also able to perform aliquot and shape casting in the same day, allowing two shape castings to be produced in one week. Thanks to the PT-4 foundry teams for their dedication, preparation, and for continued training and qualification of operators.

Increasing operational flexibility & product sales in actinide operations
In LANL's Plutonium Facility (PF-4), employees completed the Implementation Verification Review (IVR) to implement a new material at risk (MAR) LCO (3.7.1.5) which will allow storage of Radioisotope Thermoelectric Generators (RTGs) in two specific basement safes. A material at risk (MAR) limit for the PF-4 basement was reviewed and determined that manufactured radioisotope thermoelectric generators (RTGs) could be stored safely in the two specific basements safes, in support of both the LANL Defense production and stockpile surveillance

missions. This key change will help LANL personnel control their exposure to radiation while still keeping operations moving forward. This multi-month effort was implemented on November 16 when the final verification of MAR Tracker was completed.

Meanwhile, on the same day, a production lot of Heat Source Final Assembly (HSFA) parts were Diamond Stamped with no quality assurance defect reports, which means the parts meet all the necessary criteria in support of ALDWP's Defense production missions. Sales with zero defects provide confidence to LANL customers that the production organizations make high quality products to support important national security and space missions. Prior to this sale, the last production lot of HSFA's were Diamond Stamped on July 16, 2020.

December 8, 2021

Nuclear material inventory hits target time for completion
The TA-55 October 2021 Physical Inventory (PI), which began on October 20, 2021, officially closed on November 30, 2021. Nine of 11 Material Balance Areas (MBAs) were released back into production within 17 business days, meeting a four-week goal for closure based on the 4/10 work schedule. The last couple MBAs were released 9 workdays later (again based on the 4/10 work schedule). The agreed upon target closure date between the Safeguards Division Nuclear Material Control & Accountability program (SAFE-NMCA) and Weapons Production was established in December 2020 to improve inventory cycle-time performance without sacrificing NMCA inventory standards.

The overall goal with each inventory cycle, once performance is sustained based on process improvements, and target dates are repeatedly met, is to then set a new, lower target date with the eventual goal of a two-week inventory in the next few years. Physical inventories, in conjunction with other SAFE-NMCA program elements, ensure accountable nuclear material is not missing, and discrepancies between the PI and LANL's accountability system records are detected and resolved.

Given that production is paused during inventory, a shorter inventory period means more production time for PF-4 operating groups, and significant cost savings. Since the fall of 2020, SAFE-NMCA and ALDWP have focused on increased planning, collaboration and communication based on inventory lessons learned. These deliberate, self-reflecting, forward thinking actions have greatly contributed to shorter inventory periods, going from months to weeks.

ALDWP receives Ethics award for workplace improvements
The Associate Laboratory Directorate of Weapons Production was one of three winners of the annual Ethics Recognition Prgoram Step Up Award, announced on November 29. The awardees are selected based on metrics that reveal employee involvement in Ethics-related programs across the Laboratory, such as completion of Ethics training, participation in the Employees Concerns Programs, requests for ethics presentations, and more. ALDWP has implemented many initiatives in 2021 to support improvements in ethical behavior and culture.

New plutonium missions website launched to support recruitment
A new website has been launched to support recruitment and hiring for jobs in all plutonium missions fields. The website, found at plutoniummissions.lanl.jobs , was developed by an outside agency in order to support unique functionality, while content and design was driven by Communications and External Affairs team members alongside key stakeholders in the Weapons Production ALD and Human Resources. The project required significant collaboration

among a variety of organizations within LANL and will serve as a key tool for mission-oriented recruitment across ALDWP and ALDPI.

December 15, 2021

PT Group put safety first and paused work
In the Pit Technologies Metal Production Group (PT-1), employees paused work after a miscommunication during glove changes in PF-4. The team used the "everyone is responsible for safe work" principle from the Safe Conduct of Research (SCoR) to address the miscommunication. The work was paused after conflicting information about whether employees could be in the room during the glove change the week of December 6. As a result, the employees were instructed to doff their level 2 anti-Cs (Tyvek suits) and survey out of the 400-area management room. After a momentary pause to address the questions, the team was still on-board to continue, but then realized that there were not enough Tyvek suits for everyone. At that point they called the job, work was rescheduled and later completed safely and according to the plan.

Successful collaboration enables completion of detonator shipment
The shipment of a 1E40 detonator cable assembly sub-lot to Pantex was completed during the week of Dec. 5 in a collaborative effort among Detonator Production (DP) groups, PAQ, and ALDW group E-5 (Experimental Device Engineering and Assembly). DP and E-5 have been collaborating on multiple opportunities and this shipment highlights one of these efforts. E-5 coordinated resources for the shipment based on standards for the 1E40 program; quality teams worked in coordination to ensure the shipment met all quality needs; and the smallest detail for the shipment were overseen until it left the dock to its final destination. This effort reveals successful collaboration across groups, divisions, and directorates within the Weapons Program in support of stockpile stewardship.

December 22, 2021

ALT941 program diamond stamps and maintains steady delivery of products
The first diamond stamped ALT941 component shipment was successfully sent to the Kansas City National Security Complex in October 2021. The third diamond stamp shipment went out this week. Components in the December shipment were from two separate diamond stamping sessions on Dec. 6 and Dec. 9 respectively. Completing two diamond stampings in one week is a testament to the quality of the submittal (product data package and the product itself), increased capacity of product verification and submittal, and collaboration with the field office to help meet production deliverables. These submittals are among the first that were certified by the newly qualified product verifiers. These products also represent the first diamond stamped products manufactured and sold out of the newly opened Mark Quality Manufacturing Center at the Prototype Fabrication facility, and are in support of the requirements for the B61-12 life extension program. The two shipments put the ALT 941 components ahead of the integrated contractor order schedule.

Transuranic waste facility streamlines and strategizes drum storage
In late November, employees at the Transuranic Waste Facility (TWF) developed and implemented a new systematic approach to drum storage and identification. The change was employee-initiated and was in response to recent occurrences of moving drums that were not yet ready for shipment. To be more productive as well as practice ALARA (radiation exposure as low as reasonably achievable), TWF employees strategized and implement a new way of doing things. The TWF team collected the information needed to understand and characterize

the drums in storage, created spreadsheets by building with detailed location information, and implemented the building reorganization (moving drums to their new locations based on this system) within two weeks. Now, drums meant to be in long term storage are in a separate area from drums ready for shipment, making the latter more accessible and visibly clear on where each drum belongs. This reorganization will assist the team with identifying drums, moving drums, and the documentation that follows the job to be more efficient and maintaining the practice of ALARA and good conduct of operations.

Final TRU waste shipments for 2021 set record-breaking pace

Environment & Waste programs have kept ahead of the game on transuranic (TRU) waste shipping throughout 2021 and already in FY22. The final two trucks of TRU waste for the calendar year shipped on Dec. 16. The decreasing inventory of TRU waste at TA-55 is on the right trend, with inventory at less than 1000 drums, continuing to make room for future production. Waste processing and shipping teams are working at a record setting pace for shipments, with 19 shipments made so far in FY22.

Critical Experiment completed in support of PF-4 aqueous chloride operations

Significant criticality experiments were completed in a measurement campaign during December 2021 at the DOE's National Criticality Experiments Research Center (NCERC) at the Nevada National Security Site. The results will provide impactful input towards enhanced aqueous chloride processing criticality safety evaluations. Measurements were collected in three unique critical experiments investigating the effects of chlorine interstitial material in a critical reactor system. Aqueous chloride operations at PF-4 at LANL serves the crucial role of recovering plutonium from pyrochemistry salt residues and other processes, which is necessary for the pit manufacturing mission. Current criticality safety limits for aqueous chloride are limited to 520 grams of plutonium in solution – however, the significant quantities of chlorine in solution, known by differential measurements to have high neutron capture, are not being included in the criticality safety evaluations. These impactful measurements will provide the technical justification to include chlorine in these criticality safety evaluations, thus providing for increased mass limits. The vital experiments were a collaboration among many different divisions and groups within LANL.